

**Notice of Allowability**

Application No.

09/026,400

Examiner

Russell Kallis

Applicant(s)

MORI ET AL.

Art Unit

1638

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to amendment filed 7/02/2004.
2. ☒ The allowed claim(s) is/are 2-11,13,22-25 (renumbered 1-15).
3. ☐ The drawings filed on \_\_\_\_\_ are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☒ All    b) ☐ Some\*    c) ☐ None    of the:
    1. ☒ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08),  
Paper No./Mail Date \_\_\_\_\_
4. ☐ Examiner's Comment Regarding Requirement for Deposit  
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413),  
Paper No./Mail Date 9/08/2004.
7. ☒ Examiner's Amendment/Comment
8. ☐ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_.

### EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

The application has been amended as follows:

Claims 21 and 26 have been cancelled.

In the claims:

2. (currently amended) An isolated nucleic acid comprising:

(a) a nucleotide sequence encoding an amino acid sequence represented by SEQ ID NO: 2 or 4, wherein said amino acid sequence having nicotianamine aminotransferase activity, or

(b) a nucleotide sequence which hybridizes to the nucleotide sequence of [(a)] SEQ ID NO: 1 or SEQ ID NO: 3 when incubated in a solution of 5x Denhart's solution, 5x SSPE and 0.1% SDS at 65° C for 12 hours, washed once with 6x SSP at 65° C for 10 minutes and washed twice with 2x SSP, 0.1% SDS at 42° C for 10 minutes, and [said nucleotide sequence comprising a nucleotide sequence of DNA] which comprises a DNA sequence that is amplifiable by polymerase chain reaction [on a nucleic acid from barley] with the primers represented by SEQ ID NO: 5 and 6 repeating a cycle of incubation at 94° C for 40 seconds, followed by 40° C for 1 minute, and followed by 72° C for 2

Art Unit: 1638

minutes 25 times, and then repeating a cycle of incubation at 94° C for 40 seconds, followed by 45° C for 1 minute, and followed by 72° C for 2 minutes 25 times, [and] wherein the coding sequence of said nucleotide sequence [encoding] encodes an amino acid sequence having nicotianamine aminotransferase activity.

5. (currently amended) A plasmid comprising a nucleic acid comprising:

(a) a nucleotide sequence encoding an amino acid sequence representing by SEQ ID NO: 2 or 4, wherein said amino acid sequence having nicotianamine aminotransferase activity, or

(b) a nucleotide sequence which hybridizes to the nucleotide sequence of [(a)] SEQ ID NO: 1 or SEQ ID NO: 3 when incubated in a solution of 5x Denhart's solution, 5x SSPE and 0.1% SDS at 65° C for 12 hours, washed once with 6x SSP at 65° C for 10 minutes and washed twice with 2x SSP, 0.1% SDS at 42° C for 10 minutes, and [said nucleotide sequence comprising a nucleotide sequence of DNA] which comprises a DNA sequence that is amplifiable by polymerase chain reaction [on a nucleic acid from barley] with the primers represented by SEQ ID NO: 5 and 6 repeating a cycle of incubation at 94° C for 40 seconds, followed by 40° C for 1 minute, and followed by 72° C for 2 minutes 25 times, and then repeating a cycle of incubation at 94° C for 40 seconds, followed by 45° C for 1 minute, and followed by 72° C for 2 minutes 25 times, [and] wherein the coding sequence of said nucleotide sequence [encoding] encodes an amino acid sequence having nicotianamine aminotransferase activity.

Art Unit: 1638

6. (currently amended) An expression plasmid comprising:

(1) a promoter that functions in a host cell,

(2) a nucleic acid comprising;

(a) a nucleotide sequence encoding an amino acid sequence represented by SEQ ID NO: 2 or 4, wherein said amino acid sequence having nicotianamine aminotransferase activity, or

(b) a nucleotide sequence which hybridizes to the nucleotide sequence of [(a)] SEQ ID NO: 1 or SEQ ID NO: 3 when incubated in a solution of 5x Denhart's solution, 5x SSPE and 0.1% SDS at 65° C for 12 hours, washed once with 6x SSP at 65° C for 10 minutes and washed twice with 2x SSP, 0.1% SDS at 42° C for 10 minutes, and [said nucleotide sequence comprising a nucleotide sequence of DNA] which comprises a DNA sequence that is amplifiable by polymerase chain reaction [on a nucleic acid from barley] with the primers represented by SEQ ID NO: 5 and 6 repeating a cycle of incubation at 94° C for 40 seconds, followed by 40° C for 1 minute, and followed by 72° C for 2 minutes 25 times, and then repeating a cycle of incubation at 94° C for 40 seconds, followed by 45° C for 1 minute, and followed by 72° C for 2 minutes 25 times, [and] wherein the coding sequence of said nucleotide sequence [encoding] encodes an amino acid sequence having nicotianamine aminotransferase activity, and

(3) a terminator that functions in a host cell, wherein the promoter, the nucleic acid, and the terminator are operably linked in the above described order.

Art Unit: 1638

7. (currently amended) A process for constructing an expression plasmid, which comprises combining:

(1) a promoter that functions in a host cell,

(2) a nucleic acid comprising:

(a) a nucleotide sequence encoding an amino acid sequence represented by SEQ ID NO: 2 or 4, wherein said amino acid sequence having nicotianamine aminotransferase activity, or

(b) a nucleotide sequence which hybridizes to the nucleotide sequence of [(a)] SEQ ID NO: 1 or SEQ ID NO: 3 when incubated in a solution of 5x Denhart's solution, 5x SSPE and 0.1% SDS at 65° C for 12 hours, washed once with 6x SSP at 65° C for 10 minutes and washed twice with 2x SSP, 0.1% SDS at 42° C for 10 minutes, and [said nucleotide sequence comprising a nucleotide sequence of DNA] which comprises a DNA sequence that is amplifiable by polymerase chain reaction [on a nucleic acid from barley] with the primers represented by SEQ ID NO: 5 and 6 repeating a cycle of incubation at 94° C for 40 seconds, followed by 40° C for 1 minute, and followed by 72° C for 2 minutes 25 times, and then repeating a cycle of incubation at 94° C for 40 seconds, followed by 45° C for 1 minute, and followed by 72° C for 2 minutes 25 times, [and] wherein the coding sequence of said nucleotide sequence [encoding] encodes an amino acid sequence having nicotianamine aminotransferase activity, and

(3) a terminator that functions in a host cell, wherein the promoter, the nucleic acid, and the terminator are operably linked in the above described order[.], thereby generating an expression plasmid.

Art Unit: 1638

11. (currently amended) A process for enhancing iron absorbing ability of a plant cell [which absorbs iron using mugineic acid compound to solubilize the iron, which process comprises] comprising introducing into a plant cell which absorbs iron using mugineic acid compound to solubilize the iron, an expression plasmid formed by combining:

(1) a promoter that functions in a host cell,

(2) a nucleic acid comprising:

(a) a nucleotide sequence encoding an amino acid sequence represented by SEQ ID NO: 2 or 4, wherein said amino acid sequence having nicotianamine aminotransferase activity, or

(b) a nucleotide sequence which hybridizes to the nucleotide sequence of [(a)] SEQ ID NO: 1 or SEQ ID NO: 3 when incubated in a solution of 5x Denhart's solution, 5x SSPE and 0.1% SDS at 65° C for 12 hours, washed once with 6x SSP at 65° C for 10 minutes and washed twice with 2x SSP, 0.1% SDS at 42° C for 10 minutes, and [said nucleotide sequence comprising a nucleotide sequence of DNA] which comprises a DNA sequence that is amplifiable by polymerase chain reaction [on a nucleic acid from barley] with the primers represented by SEQ ID NO: 5 and 6 repeating a cycle of incubation at 94° C for 40 seconds, followed by 40° C for 1 minute, and followed by 72° C for 2 minutes 25 times, and then repeating a cycle of incubation at 94° C for 40 seconds, followed by 45° C for 1 minute, and followed by 72° C for 2 minutes 25 times, [and] wherein the coding sequence of said nucleotide sequence [encoding] encodes an amino acid sequence having nicotianamine aminotransferase activity, and

Art Unit: 1638

(3) a terminator that functions in a host cell, wherein the promoter, the nucleic acid, and the terminator are operably linked in the above described order, [expressing in said cell the amino acid sequence encoded by said nucleic acid, and enhancing production in said cell of mugincic acid compound that solubilizes iron, wherein the iron absorbing ability in said cell is enhanced.] and expressing said nucleic acid, wherein expression of said nucleic acid in the plant cell enhances iron absorbing ability of the plant cell.

25. (currently amended) An isolated nucleic acid comprising:

(a) a nucleotide sequence encoding an amino acid sequence represented by SEQ ID NO: 2 or 4, wherein said amino acid sequence having nicotianamine aminotransferase activity, or

(b) a nucleotide sequence [obtainable] from barley, said nucleotide sequence [hybridizing under stringent conditions] hybridizes to the nucleotide sequence represented by SEQ ID NO: 1 or 3[,] when incubated in a solution of 5x Denhart's solution, 5x SSPE and 0.1% SDS at 65° C for 12 hours, washed once with 6x SSP at 65° C for 10 minutes and washed twice with 2x SSP, 0.1% SDS at 42° C for 10 minutes, and wherein said nucleotide sequence encodes [encoding] an amino acid sequence having nicotianamine aminotransferase activity.

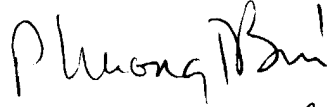
Art Unit: 1638

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Russell Kallis whose telephone number is (571) 272-0798. The examiner can normally be reached on M-F 8:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amy Nelson can be reached on (571) 272-0804. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Russell Kallis Ph.D.  
September 8, 2004

  
PHUONG T. BUI  
PRIMARY EXAMINER  
9/13/04